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Nothing is so envied as genius, nothing so hopeless of attainment by labor alone. Though labor always accompanies the greatest genius, without the intellectual gift, labor alone will do little.

It is possible to evade the prohibition authorities, but you may be sure the fruit flies will find you out.—*G. R. Press.*

MONTHLY REVIEW

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VOL. VIII SEPTEMBER No. 9

EDITORIAL

In the opinion of most people, education consists of hanging, somewhere in the home, three separate things, all of which are generally framed and glazed.

First—A small, cheap piece of parchment paper certifying that Johnny Jones has completed the course prescribed for students of the grammar grades of the Public Schools, and is fully qualified to enter the High School of his city.

Second—A somewhat larger and better quality of parchment paper, stating that John J. Jones has completed the prescribed course of study in the High School to which he has been assigned; that the public school system has turned him out as a finished product of their wonderful educational facilities, "Better than any other city in the country," which course has been prescribed by a Board of Education, composed of men (and women also), elected because they secured the larger number of ballots at the poorly-attended school election.

Ostensibly, of course, the above courses are given under the direction and with the approval of State educational departments; but what local school authorities can not do, and do not do, to a State educational program is not worth considering.

Third—After four or more years in a higher institution of learning, a genuine parchment is issued that attests to the fact that J. James Jones has satisfactorily completed his collegiate course, and is entitled to all the distinction that pertains to a college degree called "Bachelor" of something or other.

All the foregoing testifies to the fact that J. Jones is actually ready to learn something.

Our opinion is that many of the men that read this, perhaps with so little of the "prescribed" that they could not pass an eighth grade examination, are better educated than the young man above described.

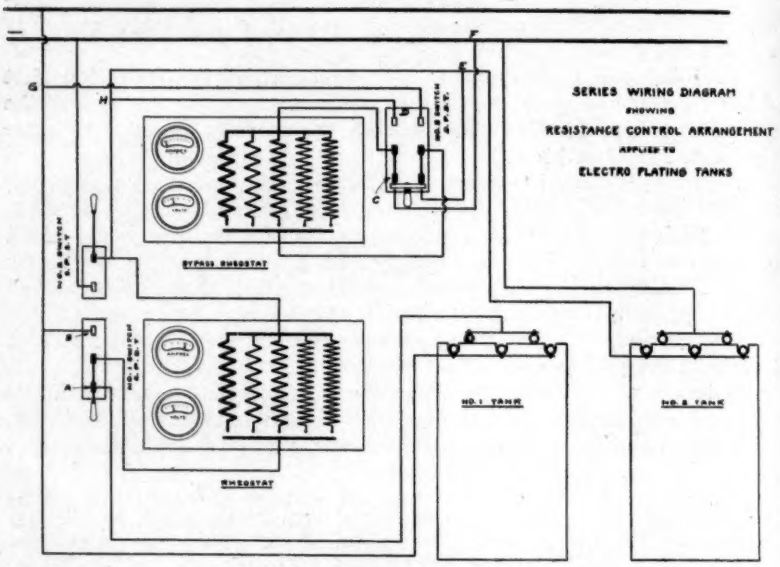
True education is: **The combination of both knowledge and practice in one or more lines of human endeavor, combined with more or less knowledge of many other things.** One member of the staff of a very large University in the Middle West did not even secure the diploma of a high school; however, that man has never ceased study; since leaving school at an early age—more than forty years—has studied hard in his own particular specialty, which covers a rather broad field.

We of the A. E. S. have a profession which requires long years of somewhat intensive study. The simple reading of the "REVIEW" and of the trade papers is not enough. We must emphasize the fact that our profession must consist of men who will sacrifice a large portion of their spare time to study along the line of our profession, such men may, dependent upon time and effort spent, if their development is broad enough, consider themselves as truly educated men.

SERIES AND PARALLEL CONNECTIONS FOR PLATING TANKS

By E. W. Heil, St. Louis Branch.

Economy in the plating-room has always receive a large share in the discussions among platers. Saving methods in the use of chemicals and metals have been pointed out, and unnecessary waste has been eliminated. The fact that a large part of the electric current generated for depositing metals is being wasted in heating resistance coils, has received a share in our discussions.



The loss of electric energy is large. Some of it cannot be avoided; yet the proposition of saving a part of it is worthy of thought and consideration in the interest of economy. To measure the loss, it is only necessary to multiply the drop in volts across the rheostat by the current flow in amperes, which equals the amount of wasted energy in watts.

Where it is possible to regulate the line voltage by using a rheostat in the field of the dynamo, the loss is not so great, but usually the plating-room has mechanical platers and electric cleaners using the full five or six volts, and the line voltage cannot be reduced. If such is the case, the voltage at the still plating-tanks must be cut down by resistance coils, and here is where the waste is found.

Consider a plating-room generating 2,000 amperes at

5 volts and if 500 amperes are used at 5 volts for electric cleaning and mechanical plating, then 1500 amperes are used for still plating. If the still plating-tanks are operated at 2½ volts, then the drop is 2½, which, multiplied by the 1,500, equals 3,750 watts, or a waste of energy equal to five horsepower. These conditions vary greatly in different plating-rooms, yet the electric energy wasted in the rheostats is usually equal to that used to plate the load.

Where the voltage drop caused by the rheostat is equal to or greater than that across the tank mains, it has been suggested that two tanks be plated in series. The proposition would not be difficult if both tanks required the same current flow, and the installation would be an easy matter if both tanks could be loaded and unloaded at the same time. Two plating-tanks with loads requiring different current flows, may be operated in series by installing a by-pass rheostat of a capacity to shunt an amount of current equal to the difference between loads. If it is also desired to operate either of the tanks separately or in series, the same can be accomplished by using three switches with the by-pass.

Such an installation was put to use at the Coleman Lamp Company about two years ago, and we give Mr. Burton Daw credit for the by-pass arrangement. The writer is merely presenting the idea from a practical standpoint, after using it continuously since the installation.

The drawing is an outline of the installation, showing the connections. The instruments may be installed on a panel over one tank, and the connecting conductors may be put behind the board. The instruments are switches No. 1, No. 2, and No. 3, one rheostat and one by-pass resistance.

To plate both tanks in series, throw No. 1 switch down to position at A, and switch No. 2 should be open; then the current may be regulated as desired with the rheostat. The path of the current is from the positive bus-bar to the anodes of tank No. 1 thru the solution to the cathode; then up thru No. 1 switch to the rheostat and over to the positive side of tank No. 2, and thru tank No. 2 in the regular way and up to the negative bus-bar.

If there is a difference between the loads, and it is desired to use 300 amperes in tank No. 1, and 225 in tank No. 2, then throw No. 3 switch down to position C and adjust resistance in the by-pass for 75 amperes. The ammeter on the rheostat should read 300 and the ammeter on the by-pass, 75 amperes. The current flowing thru tank No. 2 is the difference between 300 amperes and 75 amperes, or 225 amperes.

The path of the current is the same as in the former case, except that 75 of the 300 amperes, after flowing thru tank No. 1 are shunted at point E before reaching tank No. 2, and flow thru the by-pass resistance to the negative bus-bar at F.

If the larger load is to be plated in tank No. 2, then throw No. 3 switch to position at D, and by adjusting the by-pass resistance, any desired part of the current may be shunted around tank No. 1 from positive conductor at G thru the by-pass to the conductor between the tanks at point H where it unites with the current from tank No. 1 and the entire current flow passes thru tank No. 2.

If it is desired to plate tank No. 1 only, throw No. 1 switch to position A and close No. 2 switch and regulate the current with the rheostat. The path of the current is from the positive bus-bar thru tank No. 1 in the regular way, and up thru No. 1 switch thru the rheostat and No. 2 switch to the negative bus-bar.

Number 1 switch, when thrown up to position at B, cuts out tank No. 1 and the current will flow thru the rheostat to tank No. 2 if switch No. 2 is open. The two switches should be so installed that the handles would interfere and switch No. 2 could not be closed when switch No. 1 is in position B. To plate No. 2 tank only, open No. 2 switch and throw No. 1 switch up to position B and regulate the current with the rheostat. The path of the current is from the positive bus-bar to No. 1 switch at B thru the rheostat, and over thru tank No. 2 and up to the negative bus-bar.

Plating two tanks in series is a current-conserving proposition as well as a power saver. If two tanks can be plated with the same number of amperes ordinarily used in one tank, then current is saved for use elsewhere.

Where it is possible to make use of this proposition, it will lighten the load on the dynamo, thus saving power and still maintaining the same production; and if more current is needed at any time, it will be found available without installing a new dynamo.

THE GILDER

The gilder is the man who knows that all's not gold that glitters, and yet his knowledge of the fact no thought of his embitters; for, let him work with what he will, his heart is full of hope so long as it is gold that lines his weekly envelope. And if you need a gilder now, to make your force complete, a "want-ad" will discover him, his number, and his street.

SUCCESSFUL METHODS FOR CLEANING OF METALS

By Jacob Hay, Plater Foreman of C. M. Hall Lamp Company, Kenosha, Wisconsin.

The writer has nothing very new to offer on the subject under discussion. It is only his intention to bring before you some of the practical methods of Electro and Mechanical cleaning of metals. So much has been written about the theory of cleaners and their chemical reactions and decompositions during the past few years, that it appears it might be of interest to hear from the practical side of the operations.

Conditions in the various shops are so different, that it requires different methods of handling the several classes of material according to the local working condition. The writer will try in this paper to refrain from all reference to chemical reaction, and try to bring out the practical operations as required for succesful progressive production.

The largest portion of the material handled in the shop with which the writer is connected, is steel bodies for automobile headlamps. After these steel bodies are drawn into the various shapes desired, props and fronts are soldered on to them, and due to the delay between the press operation and the soldering operation, the bodies become very rusty. To remove the rust we pickle the bodies in acid sodium sulphate, rinse in cold water, then put thru an electric cleaner composed of 4 oz. sodium carbonate plus 2 oz. caustic soda or sodium hydroxide, plus 2 oz. tri-sodium phosphate to each one gallon of water. After coming out of the electric cleaner, the parts are first rinsed in cold water and next in hot water, then put in a dry box and thoroughly dried at a temperature of 200° Fahrenheit.

Immediately before enameling, the outside surface which is to be enameled is thoroughly brushed by being held against a steel wire wheel until the surface is quite bright. In the handling of lamp bodies that have been rejected because of poor finish in the Enameling Department, and lamps returned from customers for repairs or replacements, it is necessary that the enamel be removed. This is done by placing the bodies in a solution of caustic soda of about 8 or 10 oz. to the gallon, electric current 7 to 12 volts. After the removal of the parts from this solution, the action of which is almost instantaneous in the removal of the enamel, the bodies are then cleaned in the manner previously described as an electric cleaner.

Another class of material which comprises a fair percentage of our production is our brass bicycle lamps.

All parts of this lamp are either pressed or riveted together at the time they come to the Plating Department for attention, and have been buffed on automatic buffing machines. They are first cleaned in a caustic soda solution which is agitated by compressed air. After being cleaned, they are bright dipped, and some soldering operatins are necessary. They are again cleaned in the caustic soda solution, color-buffed, and returned to the Plating Department, and racked on suitable hooks, made especially for easy handling of the particular shape of the parts to be handled.

To remove the buffing dirt, they are electro-cleaned in a solution composed of 4 oz. of sodium carbonate, plus 1 oz. of caustic soda, plus tri-sodium phosphate, with a slight addition of rosin. After removal from the electro cleaner, they are rinsed in hot and cold water and dipped in a solution of 15% hydrochloric acid and rinsed in cold water. It is the writer's belief that hot rinse water is best to use in refilling of cleaning solution tanks.

A third class of material handled is that of steel reflectors and steel bodies to be nickel plated. These parts are cleaned and plated at the same time in hot copper solution composed of 3 oz. copper cyanide, 3 oz. sodium cyanide, plus 3 oz. caustic soda per gallon of water and no cyanide or acid dips are used in the preparations of these parts to be nickel plated.

The next cleaning operation which the writer wishes to refer to is the cleaning of brass reflectors for automobile headlamps and spotlights. In the writer's opinion this is the only class of work where one may not depend entirely upon electro cleaning alone. We have found it necessary to always swab these parts after electric cleaning with a cotton swab. The electric cleaner used on this class of work consists of a solution of 4 oz. sodium carbonate, plus 2 oz. caustic soda, plus 2 oz. tri-sodium phosphate, plus 2 oz. sodium silicate to a gallon of water.

It is not the writer's belief that electro cleaning is altogether impossible, but as yet his experience has not warranted taking a chance of eliminating the swabbing operation, and the cost of the additional cleaning by the use of a swab is not as great as the possible loss thru defective work if the swabbing operation is omitted.

Much has been written on the cleaning of die castings in preparation for successful plating, and in the writer's opinion any electric cleaner that is used for the cleaning of brass can be used for the cleaning of die castings without washing in gasoline or benzine, providing there is no heavy

buffing dirt left on the surface of the articles to be plated. Die castings should not be brass or copper plated before nickel plating, as this causes more defective work than the advantage to be gained by the use of the brass or copper plate.

The parts made from hot rolled steel, which are to be electro zinc plated are cleaned in a solution made up where the quantity to be cleaned requires as much as fifty gallons of water, by the addition to the fifty gallons of water of three gallons of muriatic acid, 1½ gallons sulphuric acid, and ½ gallon nitric acid. The use of this solution, hot, will remove scale and clean thoroughly in a few seconds. After removal from the hot cleaner, rinse in cold water, then in zinc solution, either acid or cyanide. When a reasonably smooth finish is required on small castings and the cost of handling has to be kept to a minimum, the castings may be tumbled in sandstone and water by having the tumbling-barrel so arranged that running water may flow thru the barrel at all times for approximately thirty-six hours. Remove sand from the tumbling-barrel by running water thru the barrel, then add sodium carbonate and run again for two or three hours in a tumbling-barrel. The castings are then ready for plating.

It may be added that castings handled in this way come out very bright and smooth. This same method may be applied on small brass castings, and one would be surprised at the amount of labor saved over polishing and buffing.

Another good method of cleaning small parts before plating is by tumbling in sawdust and whiting. A very satisfactory finish can be secured by this method.

There are many other methods of cleaning metals that are to be plated, and the theories advanced by others have doubtless had your consideration, but this review of the methods used by the writer have been entirely satisfactory, and it is believed that these methods, if closely followed, will work out to very good advantage in the saving of time consumed in the handling of the work and in the cost of the chemicals used.

Be sure, said we severely to the beautiful girl who stood on the corner this morning shivering in her summer lace stockings, your shins will find you out.—*G. R. Press.*

Our memory goes back to the time when property owners were urged to cut the weeds at the side of the street so they would not wet women's skirts.—*G. R. Press.*

COPPER

Read at the Indianapolis Convention by O. J. Sizelove, Newark Branch.

Edited by Prof. Keith Kennedy.

Copper, of all metals, is the most easily and largely deposited.

Copper was also the first metal to be deposited on a large scale.

Numerous simple experiments were made over a century ago by what is now known as the immersion method.

Spencer, in 1837, and Jordan, in 1839, succeeded in depositing copper from a sulphate solution by means of the electric current, and it is the sulphate, or acid copper solution that this paper has to deal with.

The three substances that this solution consists of are water, copper sulphate, and sulphuric acid; and a solution can be prepared from these alone that will give satisfactory results for all practical purposes.

Several additional agents have been recommended, such as molasses, grape sugar, dextrine, and aluminum sulphate; but with the possible exception of aluminum sulphate, the writer has failed to find any advantage to be gained from their use, and does not even recommend this one.

If the metal content and the amount of free sulphuric acid are maintained in proportion to the E. M. F. used; very little trouble, if any, will be encountered.

A solution that contains 6.75 oz. metal and 9.8 oz. free sulphuric acid per gallon, has given the best results. Such a solution can be made by dissolving 27 oz. copper sulphate in water and adding 5⅓ oz. (fluid) of sulphuric acid for each gallon of the solution to be made.

The deposit from this solution is fine and close-grained, and the solution throws very well into deep recesses.

I maintain all my solutions by chemical analysis, and for the benefit of those who may wish to do the same, I will give the method which may be used by any one possessing a very limited knowledge of chemistry.

Chemicals necessary for analysis:

Crystallized sodium thiosulphate ($Na_2S_2O_3+5\ H_2O$),24.822 grams per liter of water.

Caustic soda (NaOH), 20 grams per liter of water.

Oxalic acid ($C_2H_2O_4+2\ H_2O$), 2 grams.

Starch solution, 3 grams per 500 cc. of water.

Metyl Orange ($C_{20}H_{14}O$), .3 grams per liter of water.

Methyl Orange ($C_{20}H_{14}\ O$), 1 gram in 100 cc. 95% ethyl alcohol (C_2H_5OH).

Metal Content

For the metal content, what is known as the iodide method is used, which consists of converting the copper into cuprous iodide (Cu_2I_2), and titrating with a solution of sodium thiosulphate, using a starch solution as an indicator. The end point is so exact that with a little practice it can be determined to within one drop of the sodium thiosulphate solution.

Standardizing Sodium Thiosulphate ($Na_2S_2O_3$).

Weigh out exactly .2 grams of pure copper wire and dissolve in nitric acid (HNO_3), boil to expel nitric oxide (NO_2). Neutralize with ammonium hydroxide (NH_4OH), and add 5 cc. oxalic acid. Now add 3 grams potassium iodide (KI) which causes the solution to turn brown and the copper (Cu) has been converted to cuprous iodide. Dilute to 100 cc. and titrate with sodium thiosulphate solution until the brown color becomes quite light. Now add 1 cc. starch solution, this causes the solution to turn to a blue color. Continue titration with the sodium thiosulphate with constant stirring until the color changes to a light cream color. Let stand for a few minutes, and if the solution does not change to the blue color, the end point has been reached.

Calculations

Say 34 cc. sodium thiosulphate has been used. .2 divided by 34 equals .005882. That is, 1 cc. sodium thiosulphate is equal to .005882 grams copper.

For Copper Solution

Take 5 cc. solution, neutralize with ammonium hydroxide. Acidify with oxalic acid, add 3 grams potassium iodide, dilute to 100 cc. and titrate with sodium thiosulphate, using starch solution as an indicator.

Suppose 43 cc. sodium thiosulphate are used, 1 cc. sodium thiosulphate equals .005882 grams copper, 43 cc. .252926 grams copper in 5 cc. solution. .252926 times 756 equals 191.212 grams copper in 1 gallon solution, 191,212 divided by 28.35 equals 6.74 oz. copper per gallon of solution.

Standardizing for Acid Content

Take 2 grams oxalic acid, dissolve in water and dilute to 100 cc.; add a few drops of methyl orange solution and titrate with the caustic soda until the purple color of the solution, caused by adding the methyl orange, turns to a light yellow.

Say 64 cc. are used, the following reaction takes place:
$H_2C_2O_4+2\ H_2O$ plus 2 NaOH equals $Na_2C_2O_4$ plus 4 H_2O.

Mol wt. 126 Mol. wt. 80

In proportion as follows: 126:80::2:X——X equals 1.27. Or we find 1.27 grams caustic soda neutralizes or reacts with 2 grams oxalic acid. If 1.27 grams were contained in 64 cc., 1 cc. would equal 1.27 over 64, or .0198 grams caustic soda.

2 NaOH plus H_2SO_4 equals Na_2SO_4 plus 4 H_2O.

80 98

or 80 parts caustic soda react with 98 parts sulphuric acid. Proportion as follows: 80 : 98 : : .0198 :X—X equals .0242. Therefore each cc. caustic equals .0242 grams sulphuric acid. Take 10 cc. of the plating solution, dilute to 100 cc., adding a few drops of methyl orange and titrate with caustic soda.

Say 30.5 cc. of caustic soda are used,

1 cc. caustic soda equals .0242 grams sulphuric acid,

30.5 cc. caustic soda equals .7381 in 10 cc. solution.

.7381x378 equals 279.0018 grams sulphuric acid in 1 gal. of solution; 279.0018 divided by 1.84 equals 5.36 oz. (fluid) per gallon.

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RESEARCH COMMITTEE

Philadelphia, Pa., Sept. 7th, 1921.

Mr. Walter J. Allen, Editor,
A. E. S.,
Grand Rapids, Mich.

My Dear Mr. Allen:—

I have appointed the Messrs.:—

S. E. Hedden, 227 Fifth St., Aspinwall, Pa.
Joseph Haas, Jr., 97 W. 163rd St., New York.

William Delage, 47 Prospect St., Waterbury, Conn.

as a Research Committee, to work in conjunction with the Bureau of Standards.

Yours very truly,

PHILIP UHL, President.

MONEL METAL AND ITS USE FOR THE ELECTRO-PLATER

By O. E. Servis, Chicago Branch.

Since so many authorities on plating subjects apparently have covered the field so thoroughly, especially on the control and operation of plating solutions, there seems to be little left for the ordinary layman to present before this Convention something that might prove of interest to the trade in general. The chemical phases of the industry naturally are given first consideration, as this is of primary importance to the plater, and one that he is most interested in. However, there are a number of factors that are of more or less importance, varying with the requirements of the different plating establishments, whether they be of electrical or mechanical nature, that can be successfully applied from an efficient or economical standpoint.

Corrosion is one of the chief enemies of the plater and the tools he employs in his work, such as hooks, connection rods, pickling racks, baskets, etc., is a constant source of trouble, as they are rapidly attacked by the fumes and gases generally present in a plating-room, and nothing is more aggravating than to see that after a thorough cleaning of connection hooks and contact points, the job has to be done over again or there is sure to be some faulty features arising from improper contacts. Then again we get a new pickling basket and use it a few times, set it aside for a few days, and when we want to use it again, find that it is falling apart, corrosion having attacked it.

Some time ago the writer became interested in a metal which seems to overcome largely these objectionable features under the name of Monel Metal. Accordingly a series of experiments were begun to ascertain just what action the different corrosive elements would have upon it, and herewith we give the results of these tests in this paper.

Monel metal is not a synthetic alloy, but is a natural combination of nickel and copper which is refined without changing the relation of the important elements, nickel and copper. These important elements bear the same relation to each other when the alloy is refined and fabricated as when taken from the mines. The smelting and refining merely removes the undesirable elements. Monel metal contains approximately 67% nickel, 28% copper, and 5% other metals. Monel metal can hardly be distinguished from pure nickel in color; in tensile properties it closely resembles steel.

The point of interest to the electroplaters is the fact that Monel metal is passive to corrosion thru acids or fumes, and also resistance to corrosion, or dissolving with the current, in nickel solutions.

The tests were made in the following manner. Five glass containers, each measuring ½-pint, were filled half full with the following acids:

Glass A with acetic acid 28% Commercial.
Glass B with sulphuric acid 15% Commercial.
Glass C with muriatic acid 20% Commercial.
Glass D with a solution of Copper Sulphate 18%, and 3% sulphuric acid.
Glass E with a regular bright dip, half nitric and half sulphuric acid.

The five containers, with the different acids, were placed in a wooden box and closed for the purpose of creating strong corroding fumes, and thereby making the acid test, as well as the corroding test at the same time.

Now as the writer does not believe on single test, without a comparison of another metal at the same time, under the same conditions, iron rods were used in connection with Monel metal rods. Hot rolled Monel metal rods 5/16″ x 6″, and also hot rolled iron rods of the same dimensions. The iron and Monel metal rods 6″ long were bent in a one-way hook, 3″ one end and 2″ the other, and placed these hooks, one of each, with the longer end in the different containers with the different acids in the closed box, mentioned above, so that the hooks were immersed about 1″ in the acids, and the other 2″ of this end of the hooks were above the acids in the containers surrounded with the fumes of the invidivual acid from the container. The other shorter end of all hooks hanging over the edge of all the containers surrounded by the mixed fumes from the different acids. Every day, morning and night, the box was opened and the hooks inspected. The result, or interesting part, was that the individual acid fumes within the containers corroded the part of the iron hooks very rapidly, forming at the same time a crystallization of different colors, according to the acid.

Iron hook A in Glass A, containing acetic acid, corroded faster than all others with a black brown crystallization (acetate of iron). This crystallization, or corrosion, of the part of the hook continues in connection with acetic acid fumes, expanded after four weeks to more than twice its normal size, resembling large broken warts or grapes. The part of the iron hook immersed in the acetic acid dissolved slowly, and after four weeks, half of the rod was dissolved, forming a dark solution of iron acetate.

The acetic acid fumes had no effect on the Monel metal hook with the exception that a film of verdigris was covered all over the hook, due to the copper alloyed in this metal. The part of the Monel hook immersed in the acetic acid had a bright appearance for the reason that the scale of the Monel metal adhering to all hot rolled rods, disappeared by the action of the acid. Whether the 5/16″ rod had lost its metal could not be determined, but it may be taken for granted that a small portion of copper went into the acid solution without showing the effect after four weeks.

Iron hook B in Glass B, containing 15% sulphuric acid, was eaten away as far as immersed in the acid after 15 days, the other part of the iron hook, out of the liquid, was very heavily corroded, forming a heavy white-green crystal.

The Monel metal hook B from Glass B, with the 15% sulphuric acid, showed no sign of deterioration after four weeks with the exception that the scale was removed in the acid and a film of verdigris covered the part not in the acid. Judging from this, there is no doubt that Monel metal withstands the action of any strength of sulphuric acid.

The Monel metal hook C in Glass C, containing 20% muriatic acid, showed, after four weeks continuous immersion in acid, a slight tendency to corrosion, probably due to the copper partly separating from the parts nearest exposed to the action of the acid.

It is needless to say, that the part of the iron hook in the muriatic acid, was completely eaten away, and the parts above the acid heavily corroded with brown crystals (muriate of iron).

Monel metal hook D in Glass D, containing the Duplex Solution, showed no signs of any action of corrosion, just like in test B, but it was rather surprising that the iron hook in the Duplex Solution was dissolved away in less time than the iron hook in the 15% sulphuric acid solution.

Glass E, containing a regularly used bright dip of half nitric acid and half sulphuric acid. As it could be foreseen, nitric acid will slowly dissolve Monel metal, but the test was made inasmuch as acid would attack the metal in a regular brass dip in everyday use in the plating-room. A close inspection of the Monel hook after four weeks' immersion in the brass dip, showed a loss of metal estimated from 4% to 6%. The other part of the hook not in the brass dip stood up well, but had a heavier film of verdigris than by the sulphuric acid test.

While the iron hook out of the solution corroded very heavy with a slimy formation, the iron hook, like the Monel

hook, did not lose much metal in the solution. This may answer the question why iron dipping baskets last only a short time. It is not due to the concentrated acid while dipping, but due to the corrosion of fumes and diluted acid while standing after rinsing.

In plating departments there are many uses to which Monel metal might be applied, for instance as tie rods, nuts and washer on plating-tanks, especially is it to be recommended as such for the pickling vats and as racks or baskets for pickling, as anode hooks or stems it will be found a boon, being less subject to corrosion, and although submerged below the surface of the solutions, will not cause any appreciable harm, at the same time forming a much stronger and more rigid support for the anode than the average copper hook. Monel metal is also weaved into fine mesh with cloth interlayers, and will prove desirable in filtering solutions which attack cloth or felt filters, such as strong alkaline or acid solutions.

THE INDIANAPOLIS CONVENTION AND OTHERS.

By a Delegate.

"Not local purposes, not local prejudices, ought to guide, but the general good."—Burke.

"Let the office seek the man, not the man the office."—Cleveland.

The number and quality of papers presented at our Annual Conventions show the progress of our Society.

The last Convention (Indianapolis) excelled in both, and the grouping of different subjects treated, is a feature that should be continued at all future meetings.

Convention election methods have come in for deserved condemnation at the last three Conventions. In Philadelphia it was found that a committee arranged before the election had to be changed, after they had been named by the Chairman, as one of the members was disqualified by non-election. In Rochester, when the next year's Convention city went begging, we were told if a certain citizen was elected, his city would take the Convention. In Indianapolis it was given out that if one of the members was not appointed (elected?) his Branch would withdraw from the Society.

Are we to be an International Society, or must we remain the tail of some branch's kite, or has the tail started to wag the dog?

Now, one of the trade papers in a report of the Convention, imagines they have discovered something new in our

methods: nomination, move the nomination be closed, white ballot, good old steam-roller style. Why continue to be open to the charge that the election of officers to the Supreme Society is controlled by a small coterie of self-constituted and self-perpetuating officials? The Delegates can have the floor and the voting privilege at the Convention, but should they go up against a game where the cards are stacked? Have the Appointing Committee, who load the dice, such confidence in their judgment and their solicitude for the Society (or themselves) that they have to perfect arrangements beforehand, so that their selection shall have no opposition?

We have good men and good officers in the Society. Why not elect them on their merits instead of making a farce of their election? Then....perhaps we will have Delegates attend our Convention from Branches who have not been represented, when they find it will not be necessary to get in the ring in order to have active participation in the business of the Society.

(NOTE.—Aithough "A Delegate" gives permission for the use of his name if it is thought necessary, for quite obvious reasons we do not publish it. However, the Editor will furnish it to any person upon request.)

NICKELING DIE CASTINGS

By C. O. Field, Newark Branch.

The writer has been asked to contribute some kind of a paper to be read before the Newark Branch meeting for the purpose of bringing out discussion and also creating a desire among the members to attend the meetings regularly. The subject chosen is, *Plating of So-called Die Castings, Such as are Used on Phonograph Work.* This paper will cover an experience of the past six months, during which time many methods have been tried, but only the ones having given and which are still giving satisfactory results, are contained in this paper.

The succesful methods used are as follows:

The work to be plated is first cleaned in a mild cleaner, using electric current direct. This should have care, for if the work becomes black or stained, it is next to impossible to have a good finish on it when plated and nickel-colored. The writer usually cleans work in an electric cleaner about one minute, using seven or eight volts. It is then rinsed well in clean rinsing water and plunged into a dip of one gallon muriatic acid and fifteen gallons of water,—care must be

taken to see that no grease accumulates on top of Dipping Jar. It is then rinsed in clean rinsing water and is given a thorough rinse so that no acid from the dip may get to the nickel solutions, which is very liable to happen in the event of the operators having work to do at the time, such as elbows and many parts used in the Phonograph business, which, from their design, have a tendency to retain any solution. The above having been carefully done, they are transferred to the nickel solution composed as follows, and are plated five minutes.

10 oz. double nickel salts
6 oz. sal ammoniac
6 oz. common salt
12 oz. Boracic acid

The above solution will stand about 12° Beaumé. They are run ten seconds at six volts and then cut down to about four volts and run up to five minutes, rinsed in cold and hot water, but not too hot, and taken from racks. Occasionally it will be found necessary to add about one-half z of sodium citrate to the gallon. This seems to stop entirely the black streaks, which I presume all platers have had more or less trouble with. The writer has tried various solutions for plating die castings and the above solution and methods have proven the most successful, and are now giving almost perfect work. When failures do come, and of course they do, for the writer lays no claim to being anywheres near a 100% man, the following method is used: a strip is made to be used as an electric strip. The work is run in a cleaner to make it free from all grease and is there rinsed in boiling water and swung dry to keep off all water, only what has been originally added to strip from entering it and backing off. This takes about 1½ to 2 minutes. Proceed as follows: Sulphuric acid 66° is reduced to stand 50° Beaumé by Beaume hydrometer. To this is then added one-half z per gallon of glycerine, sheet lead anode and the current is reversed. It will be necessary to remove the lead anodes once in a while and clean them, as a red oxide forms on them. The writer cannot explain just why or what this is, as he has never had very much of a chemical education; however, there are many among you who can very readily explain it. The above methods, if care is taken, leaves the die casting nearly as good as new and saves much labor and accompanying expense. There is much more to be said and an untold amount for the writer to learn as to the plating of die castings, but we will reserve some of it for the future.

[Property of the Newark Branch, American Electro-Platers Society.]

WHAT THE BRANCHES ARE DOING

NEWARK BRANCH

At the regular meeting of the Newark Branch, held on August 5th, the attendance was small, and very little business was transacted.

The reading of a splendid paper on "Electricity," by Mr. Royal F. Clark, was deferred until we have a larger attendance.

A lively discussion on acid copper plating took place, and many interesting points were brought out.

At the meeting of August 19th, held at the Greely Hotel, the following officers were absent: Secretary Carlson and Librarian Faint.

Discussions on the following subjects took place: Dissolving, precipitation and taking up silver with cyanide preparatory to making up a silver solution. Questions asked: How much copper can be carried in a silver solution before it becomes detrimental; also how much boracic acid can be carried in a nickel solution?

Mr. Pflomm and also Mr. Haddow of the New York Branch were present.

Mr. Sizelove exhibited some samples of copper plating from an acid copper solution, showing that the size of the crystals are diminished by alternate cyanide copper plating 15 minutes, then a 45-minute run in the acid copper solution, until several hours' deposit had been made.

Mr. Sizelove also exhibited a sample of nickel plating from a bath to which sodium flouride had been added; the deposit was very bright, and exceedingly flexible. The piece of sheet brass upon which the deposit had been made, was bent back and forth several times until the sheet broke, yet the nickel deposit adhered tenaciously.

BOSTON BRANCH

Boston Branch met for the first time since May 20th, at the American House, Boston, Thursday evening, Sept. 1, 1921, with President Nihan in the chair. We had a large meeting and received one application. After the regular order of business, discussions took place on bright nickel, brass, and sulphate of copper solutions, which was very interesting. Our Past-President Mackie gave a little talk, showing how the plater, if he would watch his work carefully and see that his current was right, would have no trouble with his work.

Our next meeting will be a special one to get the members to come and see what they have missed by not being present at the past meeting. Past-President Mackie will start again with his talks on chemistry, and all members should try and get to these meetings.

BOSTON BRANCH

The regular meeting was held at the American House, on Thursday, September 15th, President Nihan in the chair.

One new application was received and one applicant elected to membership. The Branch voted to change the meeting-place to Wells Memorial Hall, 987 Washington St., Boston, the second and fourth Thursday of each month.

NEW YORK BRANCH

The regular first meeting of the New York Branch was held on August 12 at the Broadway Central Hotel. President J. A. Stremel presided. This meeting was mostly devoted to regular business and was attended by 24 members. Our last meeting in August was held with 28 members present and all the officers, and was mostly devoted to good and welfare. We have a Welfare Committee to arrange for an outing at City Island, New York, to take place on Sept. 25, 1921. A discussion on the following problems was held: Black nickel without the use of cyanide or sulphocyanide; the use of bisulphite of soda in a brass or coppor solution; brass plating without the use of zinc or copper sals. Mr. Stewart gave a lengthy talk on depositing copper 3/16" thick in a cyanide bath, which was very interesting to all present.

PHILADELPHIA BRANCH

The regular monthly meeting was held September 2nd, President George Gehling presiding. There being a small attendance owing to the hot weather, which was very regretful, as Mr. Samuel Barr gave an interesting talk and practical demonstration on the testing of nickel solution for iron.

Messrs. Scott and Fay were added to the Banquet Committee.

ST. LOUIS BRANCH

The regular meeting was held September 10th with a good attendance. In the absence of President and Vice-President, our Librarian, George Lamkemeyer, presided. One applicant was elected to membership, and the following program was adopted for the coming months: October, "Plating Tanks, Racks, and Hooks," by G. Lamkemeyer, H. Deubelbeis, E. J. Musick; November, "Electrical Equipment," H. J. Richards; December, "Preparing Surfaces of Metals for Plating," C. McGinley, C. Sebastian, G. Powitsky; January, "Compositions Used Before and After Plating," F. Terrio, G. Brandt, E. W. Mueller, H. H. Williams; February, "Methods of Storing Plated Goods," T. F. Carson, F. Menniges, H. Siemers; March, "Nickel Anodes," J. H. Jordan, Wm. Flannery, G. S. Robins, C. Fischer; April, "Pitting: Causes and Remedy," E. W. Heil, H. J. Dumas, L. Beeding, J. T. McCarthy; May, "Cleaning Metals for Plating," F. Horath, F. Weber, J. Humbrecht. All members are urged to have something on each subject. Those named above will specialize on their subject.

The outing we had in Belleville on August 27th, was well attended. H. J. Richards carried of the honors at swimming; also at the lunch tables. C. McGinley and F. Terrio were popular on the dance-floor. The ball game was for individual honors, and won by H. C. Warner of Indianapolis and G. J. Lawrence of Chicago (he of national A. E. S. fame as catcher for the West). Everybody had a real good time.

DETROIT BRANCH

No official report made. Meeting was entirely informal. Plans are being formulated for a very busy winter season. However, plans will require some co-operation by the membership.

CONNECTICUT VALLEY BRANCH

A meeting of the Connecticut Valley Branch was held at 31 Crown St., Hartford, Conn., on Tuesday, September 13. The meeting was called to order at 8:30 p. m., President James A. Bagshaw in the chair. Seven members were present. After a general talk on the deposit of black nickel on brass and steel, we adjourned to meet again on Tuesday, October 11.

CHICAGO BRANCH

Our regular meeting was held September 10th, with President Burt presiding and a good attendance.

The committee appointed at the August meeting to secure a different meeting-hall, reported that the Hardware Club had been decided upon, and a motion was carried to accept this as our regular meeting-place, beginning with the October meeting.

Dr. Blum's article in the August REVIEW was discussed at length, and many interesting points were brought out and their benefits and advantages emphasized.

CHICAGO QUESTION BOX

Question No. 1. When steel is copper-plated and then nickel-plated, does it peel easier than straight nickel-plated steel when subjected to heat?

Answer. Consensus of opinion was that if steel is properly cleaned, there will be no difference.

Question No. 2. What is the best book on plating?

Answer. THE MONTHLY REVIEW.

Question No. 3. What is the best duplex copper solution?

Answer. Solution should be brought up to 18° Baumé with sulphate of copper, then raised to 22° Baumé with sulphuric acid.

Question No. 4. Is it better to strike work in cyanide copper or nickel before copper-plating in acid copper solution?

Answer. Either one, no advantage in either.

Question No. 5. How can an exceptionally bright deposit be obtained in a cyanide copper solution?

Answer. 8 oz. lead carbonate dissolved in caustic soda or caustic potash; add water to make one gallon of solution; add 4 oz. of this solution to each 100 gallons of copper solution. Use very cautiously.

CINCINNATI BRANCH

The regular meeting of Cincinnati Branch was held September 16th at the Hill and Griffith Laboratories. After the regular business was completed, a general discussion took place with regard to the use of sodium fluoride in nickel solutions. The subject was not completed, but from what was shown, it has a possibility of wonderful future development. We started at a very low point and only reached the point

of one-sixth oz. per gallon. We think it best to develop the solution further before making any positive statements.

Several samples were plated in this solution, all of them antimony-lead castings, plating direct, running 5-10-15 minutes, 4 volts; later two samples were plated 15 minutes at 2 volts, 35 amperes; these came out bright and with good color.

The Convention Committee report progress in the right direction. The committee has organized with Thomas Whitehead, chairman; Thomas Buchanan, secretary-treasurer. The other members, C. Vance and Fred Brunner were also on the job.

We had as a visitor Mr. H. J. Richards who gave a good talk full of "pep," mostly on the question of what good membership in the A. E. S. means, its value to the member as an individual as well as to the Society. Such visitors are always welcome in a Branch meeting.

CLEVELAND BRANCH

On account of the fact that the Cleveland Branch has been without a satisfactory place to hold meetings, no regular meetings have been held for four months. However, at the last meeting, September 10th, we voted to hold regular meetings at Hotel Winton the last Saturday night of each month.

One member was elected and one transfer certificate accepted. We will promise some good material for the REVIEW soon, as a good program is in the making.

READING BRANCH

The September meeting of the Reading Branch was held on September 13th at 441 Laurel St., President Rathman in the chair. We had a very good attendance.

Mr. Fred Shadell read a paper on "Nickel Plating, Past and Present," and also exhibited samples of different nickel formulæ, which were very interesting, after which the time was filled by a general discussion.

One applicant was elected to membership.

PITTSBURG BRANCH

Our September meeting fell on the third of the month, which was the Saturday previous to Labor Day, therefore the attendance was very small. It was decided to hold a smoker and get-together meeting in October. Pittsburg Branch is more fortunate than most Branches from the fact that we have the use of the equipment, and also slides and movie reels of the Bureau of Mines, all without any charge whatever.

(Pittsburg is surely to be congratulated for two things: their wonderful opportunity, and the officers that arranged for the opportunity.—Editor.)

EDITOR'S NOTE.

On page 9 of the August issue, under discussion, paragraph 3, lines 4 and 5, iron should read ion.

In the same discussion, Mr. Thompson wishes us to state that he was not attempting to criticize the reactions as stated by Dr. Blum.

NEW MEMBERS

Chicago

Joseph Farrell.....3944 Prairie Ave., Chicago, Ill.
A. M. Koppler.....2615 N. Madison Ave., Peoria, Ill.

St. Louis

Harry Seimer.....3410 N. 14tht St., St. Louis, Mo.
William Pflueger.....4130 Clay Ave., St. Louis, Mo.

Reading

John G. Andrews.....5214 Florence Ave., Philadelphia, Pa.

Boston

Fred W. Greenwood .....

TRANSFER GRANTED

From Chicago

R. M. Goodsell.....To Milwaukee

For Associate Members Only

S. S. Teacher—Jennie, if you are a good little girl and should die, where would you go?

Jennie—I would probably go to heaven.

S. S. Teacher—And if you were a bad little girl where would you go?

Jennie—I would probably go down to the station and meet the traveling men.

"The greatest trust between man and man is the trust of giving counsel; for in other confidences men commit the parts of life, their lands, their goods, their children, their credit, some particular affair; but to such as they make their counsellors they commit the whole; by how much the more they are obliged to all faith and integrity."—Bacon.

"The firmest friendships have been formed in mutual adversity, as iron is most strongly united by the fiercest flame."—Colton.

I should not like to be rich. It makes you too forgetful of your Creator. Struggle, struggle.—*B. R. Hayden.*

BRANCH DIRECTORY

BOSTON

Regular meetings are held second and fourth Thursdays of each month, at 8 p. m., at the Quincy House. Secretary, A. W. Garrett, 37 Dorset Ave., Dorchester, Mass.

BRIDGEPORT

Meets third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, L. J. Maraffi, 744 Hancock Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Briggs House, Randolph and Wells Sts. Secretary, F. J. Hanlon, 2855 N. Richmond St., Chicago, Ill.

CINCINNATI

Meets on the first and third Friday of each month, at 1262 State Ave. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets every second and last Saturday of the month at 1344 E. Prospect St. Secretary, B. F. McCormick, 2024 Wyandotte Ave., Lakewood, O.

CONNECTICUT VALLEY

Meets at Hartford, Conn. Secretary, G. E. Vibberts, 31 Crown St., Hartford, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, C. Van Derau, 61 Bish Ave. Dayton, Ohio.

DETROIT

Meets first Friday of each month at Cass Technical High School, Platers' Classroom, 2nd Ave. and Beech St., at 8 p. m. Secretary, O. H. Phelps, 951 Clay Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., NE. Secretary, J. Andrew Warner, 738 Fairview Ave., N. E., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1728 Union St., Indianapolis. Ind.

MILWAUKEE

Meets first Friday of each month at the West Side Bank Bldg. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Secretary. A. Geroux, 48 Craig West, Montreal, Quebec, Canada.

NEWARK

Meets first, third and fifth Fridays of each month at Forresters' Home, 20 Central Ave., Newark, N. J., at 8 p m Secretary, O. F. Carlson, 225 West Grand St., Rahway, N. J

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, E. Haas, 504 East 163rd St., New York, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, C. J. Poyton, 269 Ohio Ave., Providence, R. I.

READING

Secretary, C. H. Bingham, 127 Greenwich St., Reading, Pa. (New Secretary not yet elected.) Regular meeting is held on the second Tuesday of each month.

ROCHESTER

Meets every second and fourth Friday of each month, at Hotel Seneca. Secretary, E. E. Fitch Jr., 607 Sawyer St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse N. Y.

ST. LOUIS

Meets first Saturday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDO

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, H. L. Myers, 410 Palmer, Toledo, Ohio.

TORONTO

Meets second Thursday of each month at Occident Hall, Bathurst and Queen Sts. Secretary, C. Kemish, 671 Boston Ave., Toronto, Ontario, Canada.

WATERBURY

Secretary, Wm. Delage, 47 Prospect St., Waterbury, Conn.